ANNUAL REPORT For

Calendar Year 2012

NEW ENGLAND TRANSPORTATION CONSORTIUM

NETCR92 February 2013

This report was sponsored by the New England Transportation Consortium, a cooperative effort of the Departments of Transportation and the Land Grant Universities of the six New England States, and the U.S. Department of Transportation’s Federal Highway Administration.

The contents of this report reflect the views of the author(s) who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Departments of Transportation or the Land Grant Universities of the six New England States, or the U.S. Department of Transportation’s Federal Highway Administration. This report does not constitute a standard, specification, or regulation.
NEW ENGLAND TRANSPORTATION CONSORTIUM

POLICY COMMITTEE
David B. Bernhardt, Commissioner, Maine Department of Transportation
Christopher D. Clement, Sr., Commissioner, New Hampshire Department of Transportation
Michael P. Lewis, Director of Transportation, Rhode Island Department of Transportation
Richard A. Davey, Secretary of Transportation & Chief Executive Officer, Massachusetts Department of Transportation
James P. Redeker, Acting Commissioner, Connecticut Department of Transportation
Brian Searles, Secretary of Transportation, Vermont Agency of Transportation
Matthew Hake, Division Administrator, FHWA, Vermont Division

ADVISORY COMMITTEE Transportation Agencies
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James Fallon, Manager of Design Services, Connecticut Department of Transportation
Colin Franco, Associate Chief Engineer, Rhode Island Department of Transportation
Dale Peabody, Director of Transportation Research, Maine Department of Transportation
Stephen L. Pepin, Manager of Research and ITS Planning Programs, Massachusetts Department of Transportation
Glenn E. Roberts, Chief of Research, New Hampshire Department of Transportation
Christopher Jolly, Planning & Programming Engineer, FHWA, Vermont Division

Universities
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John Collura, Professor, University of Massachusetts, Amherst
David Gress, Professor, University of New Hampshire
K. Wayne Lee, Professor/Department Chair, University of Rhode Island
Bill Davids, John C. Bridge Professor and Department Chair, University of Maine
Eric Jackson, Assistant Research Professor, University of Connecticut

LEAD STATE
William Ahearn, Materials & Research Engineer
Vermont Agency of Transportation

COORDINATOR
Amanda Hanaway-Corrente
University of Vermont
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<th>Title</th>
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A. INTRODUCTION

The New England Transportation Consortium (NETC) is a cooperative effort of the transportation agencies of the six New England States, the six New England state land grant universities and the Federal Highway Administration (FHWA). Through the Consortium, the states pool professional, academic and financial resources for transportation research leading to the development of improved methods for dealing with common problems associated with the administration, planning, design, construction, rehabilitation, reconstruction, operation and maintenance of the region’s transportation system. The Consortium’s activities are currently being managed by the University of Vermont Transportation Research Center (UVM TRC), with the Vermont Agency of Transportation (VAOT) acting as the Lead Agency.

The program is intended to supplement, not to replace, ongoing state and federal research activities and other national programs such as the National Cooperative Highway Research Program (NCHRP). To this end, a Memorandum of Understanding (MOU), establishing NETC has been consummated by the six New England state transportation agencies.

The following goals were established for NETC in order to focus the resolve of participating state transportation agencies and universities:

- Implementation of a three-pronged program for the New England region consisting of research and development; technology transfer; and education and training.
- Development of improved methods for dealing with common transportation problems.
- Providing an important source of trained professionals for employment in the Region.

NETC membership now extends to the following agencies: Connecticut Department of Transportation (ConnDOT); Massachusetts Department of Transportation; Maine Department of Transportation; New Hampshire Department of Transportation (NHDOT); Rhode Island Department of Transportation (RIDOT); Vermont Agency of Transportation (VAOT); and, FHWA.

Each of the member state transportation agencies has designated a state university to participate with the state transportation agency in developing and conducting the transportation research program. The following universities have been designated as member universities: University of Connecticut, University of Maine, University of Massachusetts System, University of New Hampshire System, University of Rhode Island, and University of Vermont.

NETC was first established, and work began, in 1986 and, over the years, has undergone a transformative process wherein the management and administrative processes have been under the governance of various governmental and non-governmental organizations. With each change in leadership, the experiential and institutional lessons that have been learned were incorporated into the administration of the program. And so, at the current time, the collective experience of over two decades is now addressed and incorporated in
the administration of the NETC program.

In 1984, the Massachusetts Institute of Technology (MIT), the state transportation agencies of five New England states (Maine, Massachusetts, New Hampshire, Rhode Island and Vermont), the American Association of State Highway and Transportation Officials (AASHTO) and FHWA initiated the first transportation pooled fund (TPF) study, administered by RIDOT, to determine the feasibility of establishing a regional consortium. In 1985, the same group of organizations initiated a second TPF study, again administered by RIDOT, to develop a work program. From 1986 to 1995, various research projects were funded through the NETC program in five funding blocks called “Rounds”.

RIDOT was the Lead Agency for the first two pooled fund studies. For the five Rounds, state funds were transferred to AASHTO, the Lead Agency (i.e., Administrative Agency), through FHWA, and a single contract was effected between AASHTO and MIT, the Coordinator. MIT would then enter into a contract with the selected university for a particular research project.

In 1994, ConnDOT stated its intention to participate in NETC and offered to act as Lead Agency. During Federal Fiscal Year (FFY) 1994, FHWA assumed the Lead Agency designation to facilitate the transition process. MIT and AASHTO exited NETC, effective FFY1994. ConnDOT entered NETC, effective FFY1995, and was the Lead Agency until the Vermont Agency of Transportation assumed the responsibility in March 2010.
B. 2012 HIGHLIGHTS

1. THE FOLLOWING NETC-FUNDED TRANSPORTATION RESEARCH PROJECTS, VALUED AT $133,939 WERE ACTIVE AT NEW ENGLAND STATE UNIVERSITIES IN 2012:

   a) UNIVERSITY OF MASSACHUSETTS DARTMOUTH: $45,842
      - Dr. Walaa Mogawer: “NETC Research Challenge – Fix It First: Utilizing the Seismic Property Analyzer and MMLS to Develop Guidelines for the Use of Polymer Modified Thin Lift HMA vs. Surface Treatments”

   b) UNIVERSITY OF NEW HAMPSHIRE: $68,085

   c) UNIVERSITY OF RHODE ISLAND: $20,012
      - Dr. Sze Yang: “Measurement of Adhesion Properties between Topcoat Paint and Metalized/Galvanized Steel with ‘Surface-Energy’ Measurement Equipment”

2. TECHNOLOGY TRANSFER:

   a) REQUESTS FOR INFORMATION AND TECHNICAL ASSISTANCE:
      The NETC Coordinator’s office responded to the following requests:
      - Rhode Island Department of Transportation, Materials Section:
        Administrative assistance re: contract language from NETC Cooperative Agreement between VAOT and UVM TRC to be used as a template for a new agreement between RI DOT and a university outside the state system.
      - Rhode Island Transportation Research Center:
        Requested that the NETC Administrator announce the 25th RI Transportation Forum to the NETC contacts.
      - New Hampshire Department of Transportation, Materials Section:
        Requested an electronic copy of NETC reports related to Hycrete. The NETC Coordinator sent an electronic copy of NETCR 73 for NETC 03-2, entitled “Field Studies of Concrete Containing Salts of an Alkenyl-Substituted Succinic Acid”

   b) CONFERENCE ATTENDANCE AND EXHIBITING:
      The NETC Coordinator’s office attended the following conferences and events:
      - Transportation Research Board 92nd Annual Meeting
        The NETC Coordinator attended a RAC Region 1 Dinner Meeting as well as a session on Best Practices for Research Programs. (January 2012)
      - National Rural Transportation Peer Learning Conference
        The NETC Coordinator attended this conference and exhibited. (April 2012)
      - Annual New England Materials & Research Engineer’s Meeting
        The NETC Coordinator attended this meeting to keep updated on current research in New England. (June 2012)
- **AASHTO Research Advisory Committee & Transportation Research Board Representatives Annual Meeting**
  The NETC Coordinator helped to organize this meeting with RAC Region 1 and exhibited at the event. (July 2012)

- **The 25th RI Transportation Forum**
  The NETC Coordinator attended this forum at the request of the University of Rhode Island Advisory Committee Member. (October 2012)

- **AASHTO 98th Annual Meeting & Trade Fair**
  The NETC Coordinator attended this annual meeting and exhibited at the trade fair. (November 2012)

**b) NETC RESEARCH PROJECT REPORTS, TECHNICAL PAPERS AND PRESENTATIONS:**
- **Research Project Reports:** Findings from the following research projects were distributed to: New England’s State Transportation Agencies and State Universities, The American Association of State Highway and Transportation Officials’ Region 1 Research and Advisory Committee, The National Technical Information Service, and the US Department of Transportation’s National Transportation Library:
  - **NETC 03-6:** “Fix It First: Utilizing the Seismic Property Analyzer and MMLS to Develop Guidelines for the Use of Polymer Modified Thin Lift HMA vs. Surface Treatments”

- **Technical Papers and Presentations:**
  - None

3 **OTHER:**

**a) NEW LEAD AGENCY:**
- Proposals for providing coordination services for the Consortium were accepted and evaluated. The Transportation Research Center at the University of Vermont was selected to provide the coordination services.

**b) PROJECTS UNDER FHWA AGREEMENTS:**
- The FHWA CT-DIV office will continue to assist with the following studies officially started by the previous NETC lead state agency (ConnDOT) that are not yet finished but for contractual reasons could not be given time extensions by the state of Connecticut: NETC 03-6, NETC 05-5, NETC 06-1. The funding to complete these 3 studies is presently reserved in SPR-3 (089).

**b) NEW COMMITTEE MEMBERS:**
- The following is a list of people who have taken over for the previous committee member from their institution:

  **POLICY COMMITTEE**
  Christopher D. Clement, Sr., Commissioner (NH DOT)
  Richard A. Davey, Secretary of Transportation & CEO (MA DOT)
ADVISORY COMMITTEE Transportation Agencies
James Fallon, Manager of Design Services (ConnDOT)

Universities
Brian H. Y. Lee, Assistant Professor (UVM)
Bill Davids, John C. Bridge Professor and Department Chair (UME)
Eric Jackson, Assistant Research Professor (UConn)

COORDINATOR
Amanda Hanaway-Corrente, Transportation Research Center (UVM)
C. PROGRESS OF ACTIVE PROJECTS

PROJECT NUMBER: 03-6

PROJECT TITLE: Fix It First: Utilizing the Seismic Property Analyzer and MMLS to Develop Guidelines for the Use of Polymer Modified Thin Lift HMA vs. Surface Treatments

PRINCIPAL INVESTIGATOR(S) & UNIVERSITY(S): Walaa S. Mogawer, PI, UMass Dartmouth; Jo Sias Daniel, Co-PI, University of New Hampshire

STATUS: Completed

AGREEMENT TERM: 10/1/2009 – 9/30/2011

ANTICIPATED COMPLETION: N/A

PROJECT OBJECTIVES:

- Define and compare thin lift overlay maintenance mixes and surface treatments currently used in the New England States.
- Evaluate the thin lift overlay maintenance mixes and surface treatments currently used in the New England States and compare to those currently used worldwide.
- Determine the current New England DOT procedures for picking rehabilitation methodologies.
- Perform and evaluate non-destructive testing to better determine the optimum time to apply surface treatments or thin lift overlay mixes to the existing pavements in order to properly prioritize rehabilitation projects.
- Evaluate the benefits and drawbacks of using PMA thin lift mixes versus surface treatments with lab testing.
- Evaluate the cost comparisons between PMA thin lift mixes and surface treatments.

PROGRESS/ACCOMPLISHMENTS THROUGH DECEMBER 31, 2012:

- Final Report Completed, Approved, and Distributed

REPORTS/PAPERS PUBLISHED, PRESENTATIONS MADE RELATING TO THIS PROJECT FROM THE START OF THE PROJECT THROUGH DECEMBER 31, 2012: None
PROJECT NUMBER: 05-5

PROJECT TITLE: Measurement of Adhesion Properties Between Topcoat Paint and Metallized/Galvanized Steel with Surface Energy Measurement Equipment

PRINCIPAL INVESTIGATOR(S) & UNIVERSITY(S): Sze C. Yang, PI, and K. Wayne Lee, Co-PI, University of Rhode Island

STATUS: Continuing


ANTICIPATED COMPLETION: 4/1/2013

PROJECT OBJECTIVES:

1. Compare the adhesion properties of NEPCOAT-approved topcoat paint over metallizing to topcoat paint over galvanizing using specialized “surface-energy” measuring lab methods. As a control the adhesion properties of topcoat paint over zinc primer painted steel substrates will also be measured.
2. Investigate various factors affecting the adhesion of topcoat paint over galvanizing.
3. Report and recommend practices which produce the best adhesion of NEPCOAT-approved topcoat paints over metalized and particularly galvanized steel surfaces.

PROGRESS/ACCOMPLISHMENTS THROUGH DECEMBER 31, 2012:

- First draft of final report completed
- Technical Committee reviewed final report and provided comments
- PI is currently working to incorporate Technical Committee comments into the final report draft.

REPORTS/PAPERS PUBLISHED, PRESENTATIONS MADE RELATING TO THIS PROJECT FROM THE START OF THE PROJECT THROUGH DECEMBER 31, 2012:

PROJECT NUMBER: 06-1


PRINCIPAL INVESTIGATOR(S) & UNIVERSITY(S): Jo Sias Daniel, PI, University of New Hampshire; Ghassan R. Chehab, Co-PI, Pennsylvania State University

STATUS: Continuing

AGREEMENT TERM: 10/1/2009 - 9/30/2011

ANTICIPATED COMPLETION: 4/1/2013

PROJECT OBJECTIVES:

• Determine the design and data collection methods, material tests, and testing equipment currently in use by each state.
• Identify the Level 2 and Level 3 design guide inputs for which regional or local values are required.
• Provide state specific recommendations on implementation of the MEPDG including changes in data collection & measurement, equipment needs, training, and anticipated benefits.
• Provide specific recommendations for regional and local calibration of the MEPDG by identifying appropriate field test & monitoring sites, data to be collected, and perform local calibrations if appropriate field data is available.

PROGRESS/ACCOMPLISHMENTS THROUGH DECEMBER 31, 2012:

1. Final Report Completed and Approved.

REPORTS/PAPERS PUBLISHED, PRESENTATIONS MADE RELATING TO THIS PROJECT FROM THE START OF THE PROJECT THROUGH DECEMBER 31, 2012:


## D. FINANCIAL STATUS OF PROJECTS ACTIVE DURING 2012

### D.1 FINANCIAL STATUS OF ACTIVE PROJECTS:

**Table 1: Financial Status of Projects Active During 2012 (As of December 31, 2012):**

<table>
<thead>
<tr>
<th>NO.</th>
<th>PROJECT TITLE, PI, UNIVERSITY</th>
<th>APPROVED BUDGET</th>
<th>INVOICES APPROVED FOR PAYMENT</th>
<th>PROJECT BALANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>03-6</td>
<td>Fix It First: Utilizing the Seismic Property Analyzer and MMLS to Develop Guidelines for the Use of Polymer Modified Thin Lift HMA vs. Surface Treatments, W. Mogawer, University of Massachusetts Dartmouth, J. Daniel, University of New Hampshire (under FHWA agreement)</td>
<td>$45,842.00</td>
<td>$44,479.52</td>
<td>$1,362.48</td>
</tr>
<tr>
<td>05-5</td>
<td>Measurement of Adhesion Properties Between Topcoat Paint and Metallized/Galvanized Steel with Surface Energy Measurement Equipment, S. Yang, K. W. Lee, University of Rhode Island (under FHWA agreement)</td>
<td>$20,012.00</td>
<td>$19,907.99</td>
<td>$102.01</td>
</tr>
<tr>
<td>06-1</td>
<td>New England Verification of NCHRP 1-37A Mechanistic-Empirical Pavement Design Guide with Level 2 &amp; 3 Inputs, J. Daniel, University of New Hampshire (under FHWA agreement)</td>
<td>$68,085.00</td>
<td>$68,085.00</td>
<td>$0.00</td>
</tr>
</tbody>
</table>
### D.2 FUND BALANCE:

#### NETC FUND BALANCE

As of January 5, 2013

<table>
<thead>
<tr>
<th>ITEM</th>
<th>OBLIGATION</th>
<th>BUDGET</th>
<th>EXPEND.</th>
<th>INVOICE</th>
<th>BALANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unexpended Balance of NETC funds from AASHTO as of 8/6/95</td>
<td>95,000.00</td>
<td>112,777.07</td>
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<tr>
<td>Member Obligations 1993 – 6 X $75,000</td>
<td>450,000.00</td>
<td></td>
<td>524,015.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coord./Admin. of NETC: Calendar Year 1995 Bdpt. – $73042</td>
<td>55,761.32</td>
<td></td>
<td>514,015.75</td>
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<tr>
<td>Continued Projects:</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>- Construction Costs of New England Bridges-Phase II</td>
<td>39,500.00</td>
<td></td>
<td>404,515.75</td>
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<tr>
<td>- Tire Chps as Lightgtht Backfill Phase II: Full Scale Testing</td>
<td>16,000.00</td>
<td></td>
<td>464,515.75</td>
<td></td>
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<tr>
<td>(Supplemental Funding)</td>
<td></td>
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<tr>
<td>- Bridge Rail Crash Test - Phase II, Sidewalk-Mounted Rail</td>
<td>134,127.00</td>
<td></td>
<td>334,385.75</td>
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<tr>
<td>- New England Vehicle Classification and Truck Weight Program</td>
<td>0.752.57</td>
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<td>327,030.10</td>
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<td>Member Obligations 1995 – 7 X $75,000</td>
<td>525,000.00</td>
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<td>852,636.10</td>
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<tr>
<td>&quot;95&quot; Project Series:</td>
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<tr>
<td>95-1: Use of Tire Chps/Soil Mixtures to Limit Pavement Damage of Paved Roads</td>
<td>75,000.00</td>
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<td>777,636.10</td>
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<td>95-2: Suitability of Non-Hydrated Soils for Wintertal Mitigation</td>
<td>39,687.70</td>
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<td>737,636.10</td>
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<tr>
<td>95-3: Implementation and Evaluation of Traffic Marking Receases for Application of Thermoplastic Pavement Marking on Modified Open Graded Mixes</td>
<td>120,812.12</td>
<td></td>
<td>616,968.30</td>
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<tr>
<td>95-5: Barrier Joints in Short Span Bridges</td>
<td>61,705.01</td>
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<td>555,250.75</td>
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<td>95-6: Guidelines for Ride Quality Acceptance of Pavements</td>
<td>106,124.00</td>
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<td>449,126.75</td>
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<td>&quot;96&quot; Project Series:</td>
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<tr>
<td>96-1: Structural Analysis of New England Substrate Materials and Structures</td>
<td>110,037.36</td>
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<td>339,069.37</td>
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<tr>
<td>96-2: Nondestructive Testing of Reinforced Concrete Bridges Using Radar Imaging Techniques</td>
<td>224,901.80</td>
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<td>114,167.57</td>
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<tr>
<td>Member Obligations 1996 – 6 X $75,000</td>
<td>450,000.00</td>
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<td>554,167.57</td>
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<td>Coord./Admin. of NETC: Calendar Year 1996: Bdpt. – $75,000</td>
<td>69,123.85</td>
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<td>452,043.72</td>
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<td>Member Allocations 1997 – 6 X $75,000</td>
<td>450,000.00</td>
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<td>545,043.72</td>
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<td>Coord./Admin. of NETC: Calendar Year 1997; Bdpt. = $52,454</td>
<td>77,244.35</td>
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<td>687,799.37</td>
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<td>&quot;97&quot; Project Series:</td>
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<td>97-3: Procedures for The Evaluation of Sheet Membrane Waterproofing</td>
<td>67,000.00</td>
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<td>900,797.37</td>
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<td>Note: Project administered by VAOT under TPR Project No. SPR-3</td>
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<td>97-4: Durability of Concrete Crack Repair Systems</td>
<td>72,030.04</td>
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<td>726,761.33</td>
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<td>&quot;98&quot; Project Series:</td>
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<td>98-1: SUPERPAVE Implementation</td>
<td>60,139.01</td>
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<td>666,622.08</td>
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<tr>
<td>98-2: Optimizing GPS: Use in Transportation Projects</td>
<td>27,006.81</td>
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<td>641,613.27</td>
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<tr>
<td>98-3: Effectiveness of Fiber Reinforced Composites as Protective Coverings for Bridge Elements, etc</td>
<td>135,000.00</td>
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<td>560,013.27</td>
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<td>T2 (per 12/97 Adv. Committee Mngt.) for 1998 – $16,000</td>
<td>9,551.00</td>
<td></td>
<td>497,062.21</td>
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<tr>
<td>Coord./Admin. of NETC: Calendar Year 1998; Bdpt. = $73,924</td>
<td>60,422.05</td>
<td></td>
<td>416,639.56</td>
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<tr>
<td>Refund Check (No. 15-663337), for Cy ’98 Management of NETC, from</td>
<td>336.00</td>
<td></td>
<td>416,975.56</td>
<td></td>
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<tr>
<td>UConn OSP, Ref. 7/1992 letter to J. Sime from J. Devereux, UConn OSP</td>
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</tr>
<tr>
<td>Member Obligations 1998 – 6 X $75,000</td>
<td>450,000.00</td>
<td></td>
<td>866,975.56</td>
<td></td>
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<tr>
<td>&quot;99&quot; Project Series:</td>
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<tr>
<td>99-1: A Portable Method for Determining Chloride Concentration on Roadway Pavements</td>
<td>96,669.05</td>
<td></td>
<td>770,308.05</td>
<td></td>
<td></td>
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<tr>
<td>99-2: Performance Evaluation &amp; Economic Analysis</td>
<td>90,667.79</td>
<td></td>
<td>679,636.27</td>
<td></td>
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</tr>
<tr>
<td>99-3: Determining Properties, Standards &amp; Performance of Wood Waste Compost, etc</td>
<td>104,737.35</td>
<td></td>
<td>571,319.54</td>
<td></td>
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<tr>
<td>Alloc. to ConnDOT for Constr. Costs of Test Site (Approved 1/2/99 Ballot)</td>
<td>10,700.00</td>
<td></td>
<td>516,765.80</td>
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<tr>
<td>99-4: Early Blasting of Open-Cutted Friction Course</td>
<td>57,456.71</td>
<td></td>
<td>450,269.89</td>
<td></td>
<td></td>
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<tr>
<td>Travel Tech. Comm. (Aug. 98 tel. poll) for 1998 – $5,000</td>
<td>0.00</td>
<td></td>
<td>450,269.89</td>
<td></td>
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<tr>
<td>ITEM</td>
<td>OBLIGATION</td>
<td>ENCUMBR</td>
<td>EXPEND.</td>
<td>INVOICE</td>
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### NETC FUND BALANCE

**As of January 5, 2013**

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<tr>
<td>05-7: Warrants for Exclusive Left Turn Lanes at Unsignalized Intersections and Driveways Phase II</td>
<td></td>
<td>7,431.26</td>
<td>481,952.50</td>
<td></td>
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<tr>
<td>05-8: Evaluation of Alternative Traffic Simulation Models, including CA4PRS for Analysis of Traffic Impacts of Highway Construction, Reconstruction and Rehabilitation. Cont’d as 05-8 (FHWA)</td>
<td></td>
<td>94,964.22</td>
<td>386,958.28</td>
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<tr>
<td>05-8 (FHWA): Evaluation of Alternative Traffic Simulation Models, including CA4PRS for Analysis of Traffic Impacts of Highway Construction, Reconstruction and Rehabilitation</td>
<td></td>
<td>5,035.00</td>
<td>381,983.28</td>
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<td></td>
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</tbody>
</table>

**Member Obligations 2006 = $5 x $100,000 (no ME DOT allocation)**

- 500,000.00 | 881,983.28

**Note:** Maine 2006 obligations as of 11/06/06 per Portland 11/30/06 email

- 100,000.00 | 881,983.28

**Coord/Admin. of NETC Calendar Year 2006 = 131,814**

- 100,716.92 | FINAL | 881,983.28

**"55" Project Series:**

- New England Verification of NCHRP 1-37A Mechanics-Empire Pavement Design Guide with Level 2 & 3 Input Cont’d as 06-1 (FHWA) | 82,209.70 | FINAL | 759,034.50

- New England Verification of NCHRP 1-37A Mechanics-Empire Pavement Design Guide with Level 2 & 3 Input | 88,085.00 | 730,949.50

- Infrastructure Management Systems Enhancement and Integration to Support True Integrated Management Decision-Making | | | 730,949.50


- Preventative Maintenance and Timing of Applications | 200,000.00 | 621,162.50

- Winter Storm Indices for New England | 73,639.62 | FINAL | 547,322.08

**Note:** Project terminated at June 30 Adv. Comm. Mtg.

**Member Obligations 2007 = 600,000**

- 600,000.00 | 1,147,522.06

**Coord/Admin. of NETC Calendar Year 2007 = 123,401**

- 122,644.79 | FINAL | 1,024,878.17

**"55" Project Series:**

- In-Place Response Mechanisms of Recycled Layers Due to Temperature and Moisture Variations | 150,000.00 | 1,024,878.17

- Exploring the Potential of Intelligent Intersections Deployment in New England | 100,000.00 | 1,024,878.17

- Determining Optimum Distance for a Lane Drop Downstream from a Signalized Intersection | 100,000.00 | 1,024,878.17

- Reliable Travel Time Estimation to Support Real-Time System Management | | | 1,024,878.17


**Member Obligations 2008 = 600,000**

- 600,000.00 | 1,624,878.17

**NY DOT Obligation (72,000 x 8,000)**

- 80,000.00 | 1,764,878.17

**Coord/Admin. of NETC Calendar Year 2008 = 114,968**

- 131,509.90 | FINAL | 1,573,368.22
## NETC FUND BALANCE

**As of January 5, 2013**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>OBLIGATION</th>
<th>BUDGET</th>
<th>EXPEND.</th>
<th>INVOICE</th>
<th>BALANCE</th>
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<tr>
<td>06-2 EVACUATION Modeling to Assist Hazard Management and Response in Urban and Rural Areas of New England</td>
<td>140,000.00</td>
<td>1,573,368.27</td>
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<td>1,573,368.27</td>
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<td>06-3 Best Management Practices for the Invasive Polygonum Cuspidatum (Japanese Knotweed) Along Transportation Corridors</td>
<td>60,000.00</td>
<td>1,573,368.27</td>
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<tr>
<td>06-4 NETC Research Implementation Survey &amp; Synthesis (Rev from $35,000 to $60,000 NETC Adv. Comm. Mgr 5/2/10)</td>
<td>50,000.00</td>
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<td>1,573,368.27</td>
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<td>06-5 NETCAD/INUMTU Transportation Research Challenge; Commute Rideshare, etc.</td>
<td>74,558.62</td>
<td>1,573,368.27</td>
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<td>02-0 Phase II Sealing of Small Masonry Bridge Expans Joints - Field Inst. &amp; Monitoring</td>
<td>1,498,029.65</td>
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<td>1,498,029.65</td>
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<td>02-1on interaction between salinity, sed quality and amendments in roadside plantings</td>
<td>1,498,029.65</td>
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<td>08-1 Coordinating and Admin. Of NETC Calendar Year 2009 (Approved) = 130,309</td>
<td>130,309</td>
<td>2,017,652.20</td>
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<td><strong>Member Obligations 2010 = 600,000</strong></td>
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<td>09-1 Active Structural Control of Confined Support Structures: Phase 1</td>
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<td>Phase 2</td>
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<td><strong>Effective Establishment of Native Grasses on Roadside</strong></td>
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<td><strong>Advanced Composite Materials: Prototype Development and Demonstration</strong></td>
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<td><strong>Member Obligations 2011 = 600,000</strong></td>
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<tr>
<td><strong>NYSDOT Obligation</strong></td>
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<tr>
<td>10-1 A Field Evaluation of SuperPave Hot Mix Asphalt Pavement Containing 30% RAP</td>
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<td>10-2 Synthesis of Practice: Electronic Bridge Inspection Document Management Systems</td>
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<td>10-3 Low Temperature and Moisture Susceptibility of RAP Mixture with Warm Mix Technology</td>
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<td>10-4 Field Evaluation of Corrosion Protection on Bridges with A Spray Application of Disodium Tartrate (DSS)</td>
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<td><strong>Member Obligations 2013 = 600,000</strong></td>
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<tr>
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<tr>
<td>10-3 Low Temperature and Moisture Susceptibility of RAP Mixture with Warm Mix Technology</td>
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<tr>
<td>10-4 Field Evaluation of Corrosion Protection on Bridges with A Spray Application of Disodium Tartrate (DSS)</td>
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<td><strong>Member Obligations 2014 = 600,000</strong></td>
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<td><strong>NYSDOT Obligation</strong></td>
<td>50,000.00</td>
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<tr>
<td>10-1 Field Evaluation of SuperPave Hot Mix Asphalt Pavement Containing 30% RAP</td>
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<td>2,540,554.90</td>
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<td>2,540,554.90</td>
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<tr>
<td>10-3 Low Temperature and Moisture Susceptibility of RAP Mixture with Warm Mix Technology</td>
<td>150,000.00</td>
<td>2,540,554.90</td>
<td></td>
<td></td>
<td>2,540,554.90</td>
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<tr>
<td>10-4 Field Evaluation of Corrosion Protection on Bridges with A Spray Application of Disodium Tartrate (DSS)</td>
<td>2,540,554.90</td>
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<td><strong>New Round of Projects =</strong></td>
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<td><strong>Backlogged for Next Round of Projects =</strong></td>
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<tr>
<td><strong>Total Backlogged =</strong></td>
<td>1,388,937.00</td>
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</table>

**Notes:**

1. *Member FFY allocations are obligated between October 1 and December 31*
2. *A credit of $8,599.70 for NETC's overpayment to UConn for FY 2004 NETC Management was applied, by UConn, to the 'Indirect Cost' for project 06-5. Therefore although the total expenditures of the project were $26,297.69 the amount paid by NETC was $19,679.99*
3. *Per minutes of NETC Adv. Comm. Mgr 5/12/08: "It was agreed that since the uncumbered amount for NETC 06-7 was incorrectly shown in the Fund Balance Report (April 30, 2008) as $70,000 and the correct amount is $96,006, the amount of funding to be allocated for the third ranked problem statement for the FFY 09 research program (NETC 06-7) would be set at the amount of the revised uncumbered fund balance remaining (at that time) after the allocation of funds for NETC 09-1 and NETC 09-2, i.e., $46,474.**
4. *Work on project suspended pending resolution of authorization of payment for costs incurred prior to execution of project agreement. WAOT to submit request to FHWA for approval of costs incurred prior to execution of the project agreement in accordance with CFR Section 5.9.*
E. REPORTS, PAPERS AND PRESENTATIONS

E.1 POLICIES AND PROCEDURES:

E.2 ANNUAL REPORTS:
“Annual Report For Calendar Year 1995,” March 1996, NETCR3
“Annual Report For Calendar Year 1996,” January 1997, NETCR4
“Annual Report For Calendar Year 1997,” January 1998, NETCR9
“Annual Report For Calendar Year 1998,” January 1999, NETCR10
“Annual Report For Calendar Year 1999,” January 2000, NETCR21
“Annual Report For Calendar Year 2000,” August 2001, NETCR27
“Annual Report For Calendar Year 2001,” December 2002, NETCR40
“Annual Report For Calendar Year 2002,” November 2003, NETCR41
“Annual Report For Calendar Year 2003,” September 2005, NETCR55
“Annual Report For Calendar Year 2005,” August 2006, NETCR61
“Annual Report For Calendar Year 2006,” April 2007, NETCR68
“Annual Report For Calendar Year 2007,” February 2008, NETCR70
“Annual Report For Calendar Year 2008,” April 2009, NETCR75
“Annual Report For Calendar Year 2009,” March 2010, NETCR79
“Annual Report For Calendar Year 2010,” April 2011, NETCR84
“Annual Report For Calendar Year 2011,” December 2011, NETCR90

E.3 REPORTS, PAPERS, AND PRESENTATIONS 1988-1994:


E.3 **NETC REPORTS, PAPERS, AND PRESENTATIONS 1988-1994 (cont’d):**


E.3 NETC REPORTS, PAPERS, AND PRESENTATIONS 1988-1994 (cont’d):


“Regional Rail Planning In New England,” Martland, C.P. Little, and Alvaro, A.E., MIT, August 1993. (Accepted for publication 1994)


# E.4 REPORTS, PAPERS AND PRESENTATIONS 1995-2011:

<table>
<thead>
<tr>
<th>Project No.</th>
<th>Title</th>
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<tr>
<td>N/A</td>
<td>Construction Costs Of New England Bridges</td>
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<tr>
<td>N/A</td>
<td>Tire Chips As Lightweight Backfill For Retaining Walls, Phase II: Full-Scale Testing</td>
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</tbody>
</table>
|             | **Reports:**    "Tire Chips As Lightweight Backfill For Retaining Walls - Phase II,” Tweedie, Jeffrey J., Humphrey, Dana N., and Sandford, T.C., March 11, 1998, NETCR8.  
|             | **Papers and Presentations:** "Tire Shreds as Lightweight Retaining Wall Backfill-Active Conditions,” Humphrey, D. Submitted for publication in the ASCE Journal of Geotechnical and Geoenvironmental Engineering.  
|             | "Civil Engineering Uses for Tire Chips,” Humphrey D.N. A six-hour short course presented to the Nebraska Department of Environmental Quality, the Maine Dept. of Transportation, the Texas Engineering Extension Service, the Manitoba Tire Stewardship Board, the Alberta Tire Recycling Management Board, and the Arkansas Department of Pollution Control and Ecology. |
N/A Tire Chips As Lightweight Backfill For Retaining Walls, Phase II: Full-Scale Testing (cont’d):
Papers and Presentations (cont’d):


“Highway Applications of Tire Shreds,” Humphrey, D. A 7-hour short course presented to the RI DOT, April 1999.

N/A New England Vehicle Classification And Truck Weight Program, Phase I Reports:
New England Vehicle Classification And Truck Weight Program, Phase I (cont'd):

Reports (cont’d):


Papers and Presentations:


Bridge Rail Crash Test, Phase II: Sidewalk-Mounted Rail

Reports:


Papers and Presentations: None
Reports:
“Structural Analysis of New England Subbase Materials and Structures,”
Lee, K.W., Huston, M.T., Davis, J., Vajjhalla, S., June 30, 2001,
NETCR26.

Papers and Presentations:
“Structural Analysis of New England Subbase Materials and Structures,”
Davis, J. Presented at the Rhode Island Transportation and Civil

“Structural Analysis of New England Subbase Materials and Structures.”
Presented at the Northeast Graduate Student Symposium on Applied
Mechanics, University of Rhode Island, April 26, 1997.

“Structural Analysis of New England Subbase Materials and Structures.”
Presented at the Rhode Island Transportation and Civil Engineering
Forum, University of Rhode Island, October 15, 1997.

“Structural Analysis of New England Subbase Materials and Structures,”
Davis, J., Huston, M., and Lee, K.W.  Presented at the 1998 Annual
Transportation Research Board Meeting.

“Structural Properties of New England Subbase Materials of Flexible
Pavements.” Presented at the 5th International Conference on the Bearing

“Structural Properties of New England Subbase Materials of Flexible
Pavements.” Presented at the 5th International Conference on the Bearing
Capacity of Roads and Airfields on July 8, 1998.

“Characterization of Subbase Materials of Flexible Pavements With and
Without Reclaimed Asphalt Pavement,” Lee, K.W., Davis, J., and
Vajjhalla, S.  Presented at the 1999 World Congress for Korean Scientists

“Characterization of Subbase Materials of Flexible Pavements With and
Without Reclaimed Asphalt Pavement,” Lee, K.W., Davis, J. and
Vajjhalla, S.  Presented at the 12th Rhode Island Transportation Forum,
University of Rhode Island, October 15, 1999.
Nondestructive Testing of Reinforced Concrete Bridges Using Radar Imaging Techniques

Reports:

Papers and Presentations:


Nondestructive Testing of Reinforced Concrete Bridges Using Radar Imaging Techniques (cont’d):
Papers and Presentations (cont’d):


94-3 Procedures For The Evaluation Of Sheet Membrane Waterproofing:
Reports:

Papers and Presentations: None

94-4 Durability Of Concrete Crack Repair Systems:
Reports: None

Papers and Presentations:

“Durability of Concrete Crack Repair System,” Tsiatas, G. and Robinson, J. Presentation to representatives of the Chemical Grouting Division of Kajima Corporation (Japan), University of Rhode Island, College of Engineering, October 26, 1999.

95-1 Use Of Tire Chip/Soil Mixtures To Limit Frost Heave And Pavement Damage Of Paved Road
Reports:

Papers and Presentations:


"Highway Applications of Tire Shreds,” Humphrey, D. A 7-hour short course presented to the RI DOT, April 1999.

“Field Trial of Tire Shreds as Insulation for Paved Roads,” Humphrey, D., Chen, L.H., Lawrence, B. A paper presented at the 10th International Conference on Cold Regions Engineering: Putting Research into Practice, held in Hanover, NH, August 16-19, 1999.
95-2  **Suitability Of Non-Hydric Soils For Wetland Mitigation**  
*Reports:*  

*Papers and Presentations:* None

95-3  **Implementation And Evaluation Of Traffic Marking Recesses For Application of Thermo-Plastic Markings On Modified Open Graded Mixes**  
*Reports:*  

*Papers and Presentations:*  


95-5  **Buried Joints In Short Span Bridges**  
*Reports:* None

*Papers and Presentations:*  

95-6  **Guidelines For Ride Quality Acceptance Of Pavements**  
*Reports:*  

*Papers and Presentations:* None
96-1 Implementation of Superpave
Reports:
“Superpave Implementation,” Mahoney, James, Stephens, Jack E., September 1999, NETCR18.

96-3 Effectiveness Of Fiber Reinforced Composite As Structural And Protective Coverings For Bridge Elements Exposed To Deicing Salt Chlorides
Reports:

Papers and Presentations:


“Recent Advances in Fiber Composites,” Seminar Series, University Cataleuna, Spain, June 28, 1999.


96-3 Effectiveness Of Fiber Reinforced Composite As Structural And Protective Coverings For Bridge Elements Exposed To Deicing Salt Chlorides (cont’d):
Papers and Presentations (cont’d):


97-1 A Portable Method To Determine Chloride Concentration On Roadway Pavements
Reports:

Papers and Presentations: None

97-2 Performance Evaluation And Economic Analysis Of Combinations Of Durability Enhancing Admixtures (Mineral And Chemical) In Structural Concrete For The Northeast U.S.A
Reports:

Papers and Presentations:
“Performance Evaluation of Durability Enhancing Admixtures (Mineral and Chemical) in Structural Concrete,” Sund, D., Report in Partial Fulfillment of Master of Science in Civil Engineering Degree, Department of Civil and Environmental Engineering, University of Massachusetts, Amherst, September, 1999.
97-2 Performance Evaluation And Economic Analysis Of Combinations Of Durability Enhancing Admixtures (Mineral And Chemical) In Structural Concrete For The Northeast U.S.A (cont'd):

Papers and Presentations:


97-3 Determining Properties, Standards And Performance Of Wood Material As An Erosion Control Mulch And As A Filter Berm

Reports:

Papers and Presentations:

97-4 Early Distress Of Open-Graded Friction Course (OGFC)

Reports:

Papers and Presentations: None

99-1 Bridge Rail Transitions – Development and Crash Testing

Reports:

Note:
Design documents for the NETC 2-Bar Curb-Mounted and 4-Bar Sidewalk-Mounted Bridge Rail Transitions are available from the NETC Coordinator.
99-1 Bridge Rail Transitions – Development and Crash Testing (cont’d):
Papers and Presentations:


99-2 Evaluation of Asphaltic Expansion Joints
Reports:

Papers and Presentations: None

99-3 Development Of Priority Based Statewide Scour Monitoring Systems In New England
Reports:

Papers and Presentations:

99-4 Quantifying Roadside Rest Area Usage
Reports:

Papers and Presentations:
Results from the rest-area research were included in a presentation by the PI: “The Efficacy and Use of Continuous Shoulder Rumble Strips: Engineering a Solution,” presented at the November 20-21, 2002 National Summit to Prevent Drowsy Driving, National Academy of Sciences, Washington, DC, November 21, 2002 (taped by C-SPAN. Summit also covered by CNN Live Today, CNN Live on Location, CBS Early Show, National Public Radio’s Market Place, and national radio network coverage by ABC, CBS, and AP as well as two stories by nationally syndicated health columnist Jane Brody of The New York Times).
**99-6**  
**Analytical and Experimental Investigation Of The Effects Of Concrete Removal Operations On Adjacent Concrete That Is To Remain**  
**Reports:**  

**Papers and Presentations:**  


“Effect of Demolition on Remaining Part of Concrete Bridge, Numerical Analysis Vs. Experimental Results.” Presented and published in the proceedings of Internationales Kolloquium über die Anwendungen der Informatik in Architektur und Bauwesen, Germany, June 2000

“The Effect of Bridge Rehabilitation on the Remaining Structural Parts.” Presented and published in the proceedings of the ASCE conference at Stanford University, August 2000.

**00-1**  
**Ground-Based Imaging And Data Acquisition Systems For Roadway Inventories In New England - A Synthesis Of Practice**  
**Reports:**  

**Papers and Presentations:** None
**00-2 Evaluation Of Permeability Of Superpave Mixes**
*Reports:*

*Papers and Presentations:*


**00-3 Design, Fabrication and Preliminary Testing of a Composite Reinforced Timber Guardrail**
*Reports:*

*Papers and Presentations: None*

**00-4 Portable Falling Weight Deflectometer Study**
*Reports:*

*Papers and Presentations: None*

**00-5 Guardrail Testing Modified Eccentric Loader Terminal (MELT) at NCHRP 350 TL-2**
*Reports:*

*Papers and Presentations:*
Dean Alberson, Texas Transportation Institute, Principal Investigator presented the results of the crash tests conducted on the MELT guardrail terminal to the Association of General Contractors/American Road Transportation Builders Association/American Association of State Highway Transportation Officials Task Force 13 meeting in Seattle, Washington, April 2002.
00-6  Effective Visualization Techniques for the Public Presentation of Transportation

Reports:

Papers and Presentations:

00-7  A Complete Review of Incident Detection Algorithms and Their Deployment: What Works and What Doesn’t

Reports:

Papers and Presentations:
“Use of Driver-Based Data for Incident Detection,” Parkany, Emily, Submitted to the 7th International Conference on Applications of Advanced Technologies in Transportation Engineering (AATT), Boston, August 2002.

00-8  Performance and Effectiveness of a Thin Pavement Section Using Geogrids and Drainage Geocomposites in a Cold Region

Reports:

Papers and Presentations:
01-1 Advanced Composite Materials for New England’s Transportation Infrastructure: A Study for Implementation and Synthesis of Technology and Practice

Reports:

Papers and Presentations: None

01-1 Advanced Composite Materials in New England’s Transportation Infrastructure - Technology Transfer Phase 1: Selection of Prototype

Reports:

Papers and Presentations: None

01-2 Development of a Testing Protocol for QC/QA of Hot Mix Asphalt

Reports:

Papers and Presentations:

01-3 Design of Superpave HMA for Low Volume Roads

Reports:

Papers and Presentations:
01-6 Field Evaluation of a New Compaction Monitoring Device
Reports:

Papers and Presentations: None

02-1 Relating Hot Mix Asphalt Pavement Density to Performance
Reports:

Papers and Presentations:


02-2 Formulate Approach for 511 Implementation in New England
Reports:

Papers and Presentations: None

02-3 Establish Subgrade Support Values for Typical Soils in New England
Reports:

Papers and Presentations:

02-5 Determination of Moisture Content of Deicing Salt at Point of Delivery

Reports:

Papers and Presentations: None

02-6 Sealing of Small Movement Bridge Expansion Joints

Reports:

Papers and Presentations:


02-6 Phase 2  Sealing of Small Movement Bridge Expansion Joints - Phase II: Field Demonstration and Monitoring

Reports:

Papers and Presentations:


02-7  Validating Traffic Simulation Models to Inclement Weather Travel Conditions with Applications to Arterial Coordinated Signal Systems
Reports:

Papers and Presentations:


02-8  Intelligent Transportation Systems Applications to Ski Resorts in New England
Reports:

Papers and Presentations:

03-1  Ability of Wood Fiber Materials to Attenuate Heavy Metals Associated with Highway Runoff
Reports:

Papers and Presentations: None
03-2  Field Studies of Concrete Containing Salts of an Alkenyl-Substituted Succinic Acid

Reports:

Papers and Presentations:


03-3  Feasibility Study of an Erosion Control Laboratory in New England

Reports:

Papers and Presentations: None

03-3 Phase 2  Design Considerations for a Prototype Erosion Control Laboratory in New England

Reports:

Papers and Presentations: None

03-4  Measuring Pollutant Removal Efficiencies of Stormwater Treatment Units

Reports:

Papers and Presentations:

03-5 Evaluation of a Field Permeameter as a Longitudinal Joint Quality Indicator

Reports:

Papers and Presentations:


03-6 Fix It First: Utilizing the Seismic Property Analyzer and MMLS to Develop Guidelines for the Use of Polymer Modified Thin Lift HMA vs. Surface Treatments

Reports:

Papers and Presentations: None
03-7  Basalt Fiber Reinforced Polymer Composites
Reports:

Papers and Presentations:


“Investigation of Basalt Fiber Composite Aging Behavior for Applications in Transportation,” Q. Liu, M. T. Shaw, R. S. Parnas, A.M. McDonnell, Polymer Composites.


04-1 Phase2 Recycling Asphalt Pavements Containing Modified Binders - Phase 2
Reports:

Papers and Presentations:

Driver-Eye-Movement-Based Investigation for Improving Work-Zone Safety

Reports:

Papers and Presentations:

“Understanding and Quantifying Driver Response,” Muttart, J.W., Texas Association of Accident Reconstructionist Specials, Houston, TX, February 17 & 18, 2006.


04-3 Estimating the Magnitude of Peak Flows for Steep Gradient Streams in New England

Reports:

Papers and Presentations:

04-4 Determining the Effective PG Grade of Binder in RAP Mixes

Reports:

Papers and Presentations:

04-5 Network-Based Highway Crash Prediction Using Geographic Information Systems

Reports:

Papers and Presentations:


05-1 Development of Supplemental Resistance Method for the Design of Drilled Shaft Rock Sockets

Reports:

Papers and Presentations: None
05-5 Measurement of Adhesion Properties Between Topcoat Paint and Metalized/Galvanized Steel with Surface Energy Measurement Equipment
Reports: None

Papers and Presentations:

05-6 Employing Graphic-Aided Dynamic Message Signs to Assist Elder Drivers’ Message Comprehension
Reports:

Papers and Presentations:


Warrants for Exclusive Left Turn Lanes at Unsignalized Intersections and Driveways

Reports:

Papers and Presentations:
“A Decision Support System for Predicting the likely Benefits of Left-turn Lane Installation,” Ranade, S., Sadek, A.W. and Ivan, J., 2007, TRB Annual meeting, Paper No. 07-0992; January 2007; Transportation Research Record, 2023:28-36, 2007. This paper received the Best Paper Award from the Committee on Operational Effects of Geometrics at the 2008 Annual Meeting.


Evaluation and Implementation of Traffic Simulation Models for Work Zones

Reports:

Papers and Presentations:

06-1 New England Verification of NCHRP 1-37A Mechanistic-Empirical Pavement Design Guide with Level 2 & 3 Inputs

Reports: None

Papers and Presentations:


06-3 Establishing Default Dynamic Modulus Values for New England

Reports:

Papers and Presentations: None